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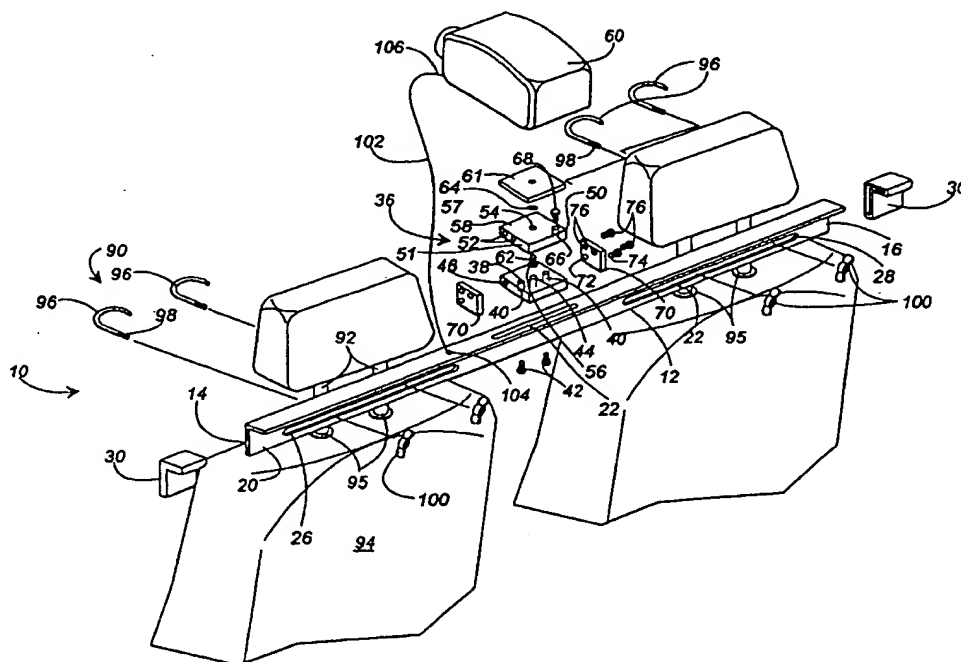
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(54) Title: CAMERA MOUNT



(57) Abstract

A camera mount for supporting a camera in a motor vehicle in which an elongated bracket (10) supports a pivotally mounted camera (60) and the opposing ends of the bracket (14, 16) are respectively attached to headrest supports (95) on seats (94) of the vehicle.

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CAMERA MOUNT
TECHNICAL FIELD

The present invention relates to mounts for cameras. More particularly, the present invention relates to a camera mount for use in vehicles.

BACKGROUND OF THE INVENTION

Movie cameras, and most recently, video tape cameras and recorders, have facilitated the recording and display of action through movies and television. In order to record action scenes, cameras have been mounted on a variety of devices. These devices include stationery mounts for recording movement of objects passing before the camera, as well as mounts which are positioned in moving objects. The ability to position a camera in a variety of locations permits a film director to record a number of different view points from which to observe the action.

Moving vehicles are one type of object which are used in movies and in sports such as automobile racing. Cameras have been mounted on stationery supports for recording motion of automobiles in action scenes. For example, movies involving car chases typically present exterior views of the automobiles in the chase. However, other perspectives of the automobile chase enhance the communication of the action. For example, a camera mounted inside the car shows the perspective view of the driver during the chase scene. Similarly, automobiles used in racing can be shown from a number of perspectives including that of spectators and the drivers. Video cameras have also recently been installed in police cars for recording real time events, such as traffic stops, high speed chases, and the like.

Various devices have been developed for mounting cameras in cars in order to provide perspective views of the action involving the car. For example, a U-shaped bracket has been provided for mounting a video camera to an interior roof of a car near the windshield, whereby the camera view is forward through the windshield in order to provide a record of traffic stops, automobile chases, and the like. Other camera mounts have been used to secure

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video or television cameras within automobiles, such as race cars to provide the drivers perspective during an automobile race being broadcasted on television. One known device for mounting a camera in a car maintains the camera level with respect to the roads surface regardless of acceleration or gravitational forces. The camera is supported on a pendulum suspended from a gimble and constrained with spring and damping elements which match the vehicle suspension system in order to produce equal and opposite rotations of the pendulum in response to the movements of the vehicle.

Other devices are less complicated. One such device mounts a camera in a protective box which attaches to the rear deck of the vehicle near the back window. Telescoping members connect the box to the rear deck. Coil springs absorb shock in order to dampen vibrations communicated to the camera. Another device provides a channel member with a depending plate at one end. The plate is received in a slot of an upper edge of a car seat which normally receives a tongue or support member of a headrest. A distal end of the channel rests on top of the dashboard of the vehicle. A camera mounts with a bolt through an opening in the channel. An elastic hold-down and stabilizing cord is used to secure the distal end of the channel to the dashboard.

While these devices have generally functioned to support a camera within a car, there are drawbacks to their use. Mounting the camera on a rear deck of a car does not satisfactorily show dashboard information which is useful and important during automobile races. Also this perspective view differs from that seen by the driver. On the other hand, placing the camera closer to the windshield using the bracket which engages the head rest channel may have the camera too far forward to show the dashboard of the car. Also, this bracket is susceptible to vibration as the distal end is not adequately secured. Further, this camera mount occupies one of the head rests and takes the space otherwise occupied by a passenger.

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Accordingly, there is a need in the art for an improved camera mount which rigidly secures to an automobile for use in holding a camera for recording images of objects from the automobile. It is to such that the present invention is directed.

SUMMARY OF THE INVENTION

The present invention meets the needs in the art by providing an elongated rigid member that has a camera support surface. A pivot plate pivotally connected to the camera support surface. The camera secures to the pivot plate. The pivot plate locks at a selected angle relative to the camera support surface, whereby the camera can be selectively tilted for adjusting the angle of the camera view for recording images. The opposing ends of the rigid member connect to respective seatbacks of the motor vehicle in which the camera mount is installed.

Further disclosed are an improved bracket and an improved camera support which attach to the elongated rigid member. The bracket for connecting the camera mount to a rectangular support for a headrest in an automobile seat comprises a block having a side defined by a first face and a second face. The faces are parallel to a plane on a longitudinal axis of the block. The first face is disposed in a plane closer to the longitudinal axis than the plane in which the second face is disposed, whereby the side of the block defines a notch therein for receiving a portion of a rectangular headrest support. The block defines a tapped bore that extends partially inwardly from the second face for receiving a fastener for connecting the camera mount to the bracket after the rectangular support is received in the notch.

A cushion pad attaches to a rear face of the camera mount. The cushion pad comprises an elongate backing board to which a cushion member of a resilient material attaches. A plurality of connectors extending laterally from the backing board on a side opposite the cushion member for

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engaging the backing board to a rearward face of the camera mount.

5 A camera support attaches to the camera to the rigid member. The camera support comprises a support plate that defines a planar surface for supporting a camera. A pair of parallel lateral sides extend from the plate, whereby the support plate defines a U-shape in cross sectional view. The support plate defines a central threaded bore for receiving a fastener therein for connecting the support
10 plate to the camera mount. A first pin connects between the lateral sides in a first distal portion of the support plate. A telescopically extendable tube attaches to the pin for pivotal movement to a selected position for being extended to a selected length for a distal end to bear
15 against a surface of the automobile. Fastener means are provided for securing a camera to the support plate.

Objects, advantages and features of the present invention will become apparent from a reading of the following detailed description of the invention and claims
20 in view of the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a camera mount bar according to the present invention attached to a seat in an automobile.

25 Fig. 2 is a perspective view of an alternate embodiment of the bracket for connecting the camera mount bar illustrated in Fig. 1 to the headrest support of a seat in an automobile.

Fig. 3 is a perspective view of a preferred embodiment of the camera mount according to the present invention.
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Fig. 4 is a perspective view of an alternate embodiment of the camera mount bar for use in automobiles which do not have headrest supports in the seats.

Fig. 5 is a perspective view of an alternate
35 embodiment of a bracket for securing the camera mount to rectangular supports for headrests in the seats.

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Fig. 6 is a perspective view of an alternate embodiment of the camera mount having a camera support for stabilizing larger cameras.

Fig. 7 is a rear perspective, partially cutaway view illustrating the camera support shown in Fig. 6 with straps to secure the camera mount to the seats of an automobile.

Fig. 8 is a perspective view of an alternate embodiment of a support block for supporting a camera on the camera mount.

Fig. 9 is a perspective view of an alternate embodiment of a support block for supporting a camera on the camera mount.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now in more detail to the drawings in which like parts have like identifiers, Fig. 1 illustrates in perspective view a camera mount bar 10 for use in automobiles, according to the present invention. The camera mount bar 10 comprises an elongate rigid angle member 12 having distal ends 14 and 16. The angle member 12 defines a camera mount surface 18 and a bracket mounting surface 20. The camera mount surface 18 defines an elongated slot 22 which is substantially parallel to a longitudinal axis of the member 12. The slot 22 is preferably positioned central between the distal ends 14 and 16. In an alternate embodiment, the elongate member 12 is a U-shaped channel. In another embodiment, the elongate member 12 is a rectangular tube.

The bracket mounting surface 20 defines a pair of elongated slots 26, 28. The slots 26, 28 are spaced apart and coaxially aligned. The slots are substantially parallel to the longitudinal axis of the elongate member 12. An alternate embodiment (not illustrated) has two pairs of slots 26, 28. The slots 26, 28 are coaxially aligned and the pair of slots 26 are spaced apart in an end portion of the elongate member 12 and the pair of slots 28 are spaced apart in the longitudinally distal end portion

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thereof. Elastic boots 30 are received on the distal ends 14 and 16.

The elongate member 12 receives a camera mount, generally designated 36. The camera mount 36 comprises a support block 38 having at least one tapped bore 40 which receives a bolt 42 extending through the slot 22 of the elongate member 12 to secure the support block to the elongate member. In the illustrated embodiment, the support block 38 defines a pair of the tapped bores 40, for rigidly connecting the support block 38 to the camera mount surface 18. The support block 38 defines a hole 44 which in the illustrated embodiment is centrally located, for a purpose discussed below. Opposing side faces of the support block 38 define lateral tapped bores 46.

A pivot plate 50 pivotally connects to the support block 38, as discussed below. The pivot plate 50 and the support block 38 pivot relative each other in clam-shell fashion. A first side portion 51 of the pivot plate 50 defines a pair of lateral tapped bores 52 on opposing sides of the pivot plate. A hole 54 is defined in a central portion of the pivot plate 50, for alignment with the hole 44 in the support block 38, for a purpose discussed below. The hole 54 is countersunk on an entry surface for a bolt 56. The hole 54 is also countersunk on the opposing bearing surface 58 that supports a camera 60. The hole 54 is countersunk on the entry surface so the head of the bolt 56 is received within the block to define a smoothly continuous plane on the entry surface. The bolt 56 is received through the hole 54. The bolt 56 defines a groove 62 in a portion of the bolt which extends above the bearing surface 58. A C-ring 64 snaps into the groove 62 to secure the bolt 56 in the hole 54. The countersunk bore in the bearing surface 58 permits the C-ring to be recessed relative to the plane of the bearing surface 58. A second side portion 57 opposite the first side portion 55 defines a hole 66 tapped through the pivot plate 50. The hole 66 receives a threaded bolt 68.

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A pair of pivot blocks 70 pivotally connect the pivot plate 50 to the support block 38. The pivot blocks have a first bore 72 which receives a bolt 74. The bore 72 aligns with one of the tapped bores 46 in the support block 38. The pivot block 70 also defines a pair of second bores 76 which receive bolts 78. The pair of bores 76 align with the pair of tapped bores 52 in the pivot plate 50.

A bracket generally 90 connects the elongate member 12 to headrest supports 92 in a seat back 94 of an automobile. The headrest supports 92 are conventionally received in slots 95 in the seat back 94. In the illustrated embodiment, the bracket comprises a J-hook 96 having a distal end 97 and a threaded end 98. (An alternate embodiment of the bracket 90 is discussed below.) The threaded end 98 of the J-hook 96 extends through the respective slot 26 and 28 and receives a wing nut 100 for securing the J-hook to the elongate member 12. The distal end 97 of the J-hook likewise extends through the respective elongate slot 26, 28, whereby the J-hook 96 enwraps the headrest support 92. The wing nut 100 is tightened on the threaded end 98 in order to rigidly secure the J-hook 96 around the headrest support 92 and thereby rigidly connect the elongate member 12 to the headrest supports 92.

One embodiment of the camera mount bar 10 includes a strap 102 that connects at a first end 104 to the elongate member 12. A free second end 106 connects to a connector on the video camera 60.

The camera mount 36 is assembled by bolting the support block 38 to the pivot blocks 70. The tapped bore 46 in a support block 38 aligns with the bore 72 in the pivot block 70. The bolt 74 engages the tapped bore 46 and connects the pivot block 70 to the support block 38. The bolt 56 is inserted in the hole 54 of the pivot plate 50. The C-ring 64 engages the groove 62 to secure the bolt 56 in the hole 54. The pivot plate 50 is then connected to the pivot blocks 70 by engaging the bolts 78 in the aligned

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pairs of bores 76 and tapped bores 52. The camera mount assembly 36 is then connected to the camera mount surface 18. The bolts 42 extend through the slot 22 into the tapped bores 40 of the support block 38. The camera mount
5 36 is slidably positioned along the slot 22 and the bolts 42 tightened to rigidly connect the camera mount to the camera mount surface of the elongate member 12.

The camera mount bar 10 is then attached to the seat backs 94 in an automobile. The J-hooks 96 extend through
10 the respective slots 26, 28 and enwrap the headrest supports 92 as discussed above. The wing nuts 100 threadably engage the threaded ends 98 in order to rigidly secure the J-hooks around the headrest supports, whereby the camera mount bar 10 is rigidly connected to the seat
15 back 94. The slots 26, 28 facilitate positioning the camera mount bar 10 in different automobiles, including compacts and larger automobiles. Also, the camera mount bar 10 connects to bucket seats as well as bench seats.

The camera 60 is connected to the camera mount 36 by
20 threading the bolt 56 into a tapped bore in the camera 60. An adjuster, such as a screw driver extends through the aligned hole 44 in order to turn the bolt 56. It may be appreciated that a resilient pad 61 is gainfully positioned between the camera 60 and the bearing surface 58 of the
25 pivot plate 50, for dampening vibrations. In the embodiment having the strap 102, the second end 106 is connected to the camera 60.

Typically, seat backs 94 are disposed at a angle, or are adjustable whereby the headrest supports 92 are
30 disposed at an obtuse angle relative to the chassis of the automobile. The camera mount bar 10 accommodates this by permitting the pivot plate 50 to adjust the tilt of the camera 60 for a straight-on shot. The bolt 68 enters the tapped bore 66. The leading end of the bolt 68 bears
35 against the surface of the support block 38 in order to tilt the pivot plate 50 to an obtuse angle with respect to the support block 38, whereby the camera 60 can be

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positioned for a straight-on view through the windshield of the automobile. Further, the camera 60 is readily disposed at an angle, such as towards the driver of the passenger, or aimed outwardly of the passenger window or rearwardly through the back window. The pivot plate 50 is locked in the selected position by tightening the bolts 74.

The camera mount 36 can be selectively positioned by sliding the camera mount 36 along the slot 22. In this way, the camera 60 can be positioned closer to the driver in order to record the instrumentation displayed on the instrument panel of the automobile. Alternatively, the camera 60 can be positioned remote from the driver in order to provide a passenger's view of the operation of the motor vehicle. Further, the elongate slots 26, 28 facilitate connecting the camera mount 36 in a selected position whereby a distal end 16 of the camera mount bar 10 extends outwardly of a passenger window in the automobile. A second slot (not illustrated) defined in the camera mount surface 18 in the distal end portion of the camera mount bar 10 facilitates mounting the camera 60 outwardly of the automobile.

Fig. 2 is a perspective view of a preferred embodiment of the bracket for securing the rigid angle member 12 to the headrest supports 92. A bracket 120 comprises a block having a face 121 which abuts the face of the bracket mounting surface 20. A pair of lands 122, 123 project from the face 121. The lands are sized to extend through the slots 26, 28 in the member 12. The block 120 also defines a bore 124 for receiving and securing a threaded connector 126 which also extends through the respective slots 26, 28. A fastener 127 threadingly engages the connector 126 to secure the block 120 to the member 12. In the illustrated embodiment, the fastener 127 has a knurled surface 128 for grasping and rotating by hand. A notch 130 is defined in the block 120 for receiving the headrest support 92 (shown in phantom line). A distal end 132 of the block 120 defines a J-hook for substantially encircling the headrest

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support 92 within the notch 130.

In use, the elongate member 12 is positioned against the headrest supports 92 as illustrated in Fig. 1. The bracket 120 is positioned against the mounting surface 20 with the headrest support 92 entrapped within the notch 130. The lands 122, 123 and the connector 126 extend through the respective slot 26, 28. The fastener 127 threads onto the connector 126. The fastener 127 is tightened to rigidly connect the block 120 to the angle member 12 and thereby rigidly connect the camera mount bar 10 to the headrest supports 92. A bubble level attached to the elongate member 12 helps to orient the member horizontally.

Fig. 3 is a perspective view of a preferred embodiment of the camera mount 36'. In this embodiment, the camera mount also forms a pivotable clam-shell structure with a support block 138 and a pivot plate 150. At least one bore 140 which receives a bolt 142 that extends through the slot 22 of the elongate member 12, for securing the support block to the elongate member. In a preferred embodiment, a pair of bores 140 and bolts 142 cooperatively connect the support block 138 to the support surface 18. The support block 138 comprises a metal plate folded to define a base 143 and a pair of sidewalls 145 and having a broad U-shaped appearance in cross-sectional view. Each sidewall 145 defines an opening 147. At least one of the sidewalls 145 also defines a second opening 149 to which a self-clinching nut 151 is secured on an inner face, for a purpose discussed below.

The pivot plate 150 pivotally connects to the support block 138, as discussed below, so that the block and the plate pivot open and closed in a clam-shell manner. The pivot plate 150 defines a top surface 153 and a pair of sidewalls 155 having a broad U-shaped appearance in cross-sectional view. The sides 155 each define an opening 157 which align with the respective openings 147 in the support block 138. At least one of the sides 155 defines

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an arcuate slot 159 which aligns with the opening 149 in the support block 138. A threaded connector 161 is received through the slot 159 and into the nut 151 for securing the pivot plate 150 at a selected angle relative to the elongate member 12. A hole 154 is defined in the upper surface of the pivot plate 150 and receives the bolt 156 for connecting to the video camera 60. The head of the bolt 156 is rotated by the reaching into the cavity between the support block 138 and the pivot plate 150. A resilient pad 159 is preferably received on the pivot plate 150 to dampen vibration communicated to the video camera 60. In a preferred embodiment, the bolt 156 is held in the hole 154 by the C-ring 164 received in the groove in the bolt, as discussed above (not illustrated in Fig. 3).

The support block 138 connects to the pivot plate by aligning the sidewalls 155 outwardly of the sidewalls 145 and inserting a pin 163 through the aligned holes 157 and 147 on each side of the camera mount 36. The pin 163 preferably is a nylon button with a stem and a knob at a distal end. The threaded fastener 161 passes through the arcuate slot 159 and into the nut 151 to secure the pivot plate 150 at a selected angle relative to the elongate member 12. The bolts 142 extend through the openings 140 and engage nuts to secure the support plate 138 at a selected position along the slot 22 in the elongate member 12.

Fig. 4 is a perspective view of an alternate embodiment of the camera mount bar 10' for installation in automobiles which do not have separate, extendable headrests with supports 92. In the illustrated embodiment, two bucket seats 170 are illustrated in phantom to show the environment of the alternate embodiment. An elongate rigid member 171 includes the elongate slot 22 in the camera mounting surface 18. However, the support surface 20 does not include the elongate slots 26 and 28. Rather, a pair of elongate flexible straps 172 are attached at a first end 174 to the support surface 20. In the illustrated

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embodiment, the first end 174 is attached intermediate the longitudinal ends 14 and 16 of the elongate member 171. The pair of ends 174 are preferably spaced apart, although that is not necessary. The strap 172 is preferably a strong woven fabric, such as a seat belt material. The first end 174 loops through an opening in a metal plate 176 and is sewn together to securely attach the end to the metal plate. The metal plate 176 is rigidly connected to the support surface 20 with rivets, bolts, or other fasteners. A pair of buckles 178 rigidly attach to the support surface 20 near the longitudinal distal ends 14 and 16 of the elongate member 12. The buckles 178 are adapted to receive and securely engage the strap 172 by passing a free end 180 through the buckle. The camera mount 36', such as the embodiment illustrated in Fig. 3, is connected to the slot 22 of the elongate member 12.

A pair of plates 182 connect to the face of the support surface 20 in spaced-apart relation. In the illustrated embodiment, the plates 182 are rectangular metal plates oriented to have a longitudinal axis substantially perpendicular to a longitudinal axis of the elongate member 171. The plates 182 bear forcibly against the back of the seat 170 in the car in which the alternate embodiment camera mount 10 is installed. The elongate member 171 extends between the seats 170 on the backside of the seats. The member 171 is held in position as the pair of straps 172 are looped around the seats. The free end 180 is received through the buckle 172 and the excess length of the strap 172 is pulled in order to cinch the strap tightly about the seat 170. The buckle 178 holds the strap 172 in a tightly cinched manner, whereby the elongate member 171 is securely held to the seats 170. The plates 182 bear against the back of the seats. The camera mount 36 is attached as discussed above to the elongate slot 22 in the elongate member 12. The camera 60 is attached to the camera mount 36, as discussed above.

Fig. 5 is a perspective view of an alternate

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embodiment of the camera mount and bracket according to the present invention. In this embodiment, the camera mount comprises an elongate tube 200 which is readily extruded and machined to define the slots 22 and the slots 26, 28 in opposing faces of the tube. A flexible plug 202 inserts into each distal end of the tube 200. A bracket 220 connects the camera mount 200 to the rectangular-type supports 204 for headrests found in some automobiles. The bracket 212 incorporates an improvement over the bracket 120 illustrated in Fig. 2. A notch 214 is machined in the bracket 220 between the arcuate notch 130 and the face 121. The notch 214 defines a face 216 and a side face 218. The face 216 provides a planar surface for abutting against a face of the headrest support 204. The side face 218 defines a stop for receiving a side edge of the headrest support 204. The side accordingly is defined by a first face 214 and a second face 121 which are parallel to a plane on a longitudinal axis of the block. The first face 214 is preferably disposed in a plane closer to the longitudinal axis than the plane in which the second face 121 is disposed. The side of the block thereby defines the notch 214 for receiving a portion of the rectangular headrest support 204. In the illustrated embodiment, the distal end 132 of the block 220 defines a face 219 which is substantially coplanar with the face 216 whereby the face of the headrest support 204 seats squarely against the bracket 220 in the notch 214. It is to be appreciated that the improved bracket 220 having the notch 130 is readily attached to tubular supports as well as rectangular support for headrests. The lands 122, 123 extend laterally from the face 121. A threaded bore 226 is defined in the bracket 220 extending from the face 121. In the illustrated embodiment, the bore extends only partially through the block. A fastener 227 engages the bore 226.

The bracket 212 operates in a manner similarly to the bracket 120 discussed above. The camera mount 200 is positioned against the headrest supports 204 as illustrated

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in Fig. 5. The bracket 220 is positioned against the camera mount 200 with the headrest support 204 received in the notch 214. The side edge of the support 204 bears against the side 218. The surfaces 214 and 219 bear against the support 204. The lands 122, 123 extend through the slot 28 of the tubular camera mount 200. The fastener 227 threads into the bore 226 to rigidly connect the block 220 to the camera mount 200, and thereby rigidly connect the camera mount to the headrest supports 204.

Fig. 5 further illustrates a cushion pad 240 that attaches to a rear face 242 of the camera mount 200. The pad 240 includes a cushion member 244 attached to an elongate backing board 246. In the illustrated embodiment, the cushion member 244 is made of an extruded resilient material and defines a C-shape in cross-sectional view. The member 244 attaches with an adhesive to the backing board 246. A plurality of threaded connectors 248 extend laterally from the backing board 246 on a side opposite the cushion member 244 for connecting the cushion pad 240 to the camera mount 200. In use, the threaded connectors 248 extend through the slots 26, 28 and receive nuts 248a on the opposing side of the camera mount 200 for rigidly connecting the cushion pad to the camera mount. The member 44 provides a cushioned surface on the rear face of the camera mount for protecting a person operating the camera from a back seat of the automobile against bumps or bruises. The cushion pad 240 also can be attached to a front face of the camera mount 200.

Fig. 6 is a perspective view of an alternate embodiment of a camera support 250 for the camera mount 200, for holding larger cameras. The camera support 250 provides increased stability of the camera during operation of the automobile. The camera support 250 has a support plate 252 that defines a planar surface for supporting a camera. A pair of lateral sides 254 extend downwardly from the plate 252. The support plate thereby defines a U-shape in cross-sectional view. The support plate 252 defines a

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central threaded bore 256 for receiving a fastener 258 therein for connecting the support plate to the camera mount 200. In the illustrated embodiment, the support plate 252 connects to a pivot plate 259, such as the pivot plate 150 or other such pivot plates disclosed herein. The pivot plate separately connects with the bolt 258 to the camera mount 200. The pivot plate 259 permits angling the camera in order to orient the camera in a horizontal plane, as discussed below.

At least one pin connects to the side 254. The illustrated embodiment includes a pair of pins 260 that connect between the lateral sides 254 in respective distal end portions of the support plate 252. A telescopically extendable tube 262 attaches to each of the pins 260. A pair of bearings 264 dispose the tube 262 centrally on the pin 260. A connector 266 connects the tube 262 to the pin 260. The pin 260 is pivotable between the sides 254, whereby the telescopic tube 262 can be disposed extending from the support plate 250 at a range of selected angles. The support plate 252 further defines a bore 265 for receiving a fastener 267 for connecting a camera 268 to the support plate. In an alternate embodiment, the support plate 252 comprises an angle member having one lateral side, which is useful with lighter, smaller cameras. In this alternate embodiment, the pin 260 extends laterally as a cantilever from the side 254.

In use, the camera support 250 is attached to the camera mount 200, either directly or preferably with one of the pivot plates disclosed herein. A camera is attached with the fastener 267 to the support plate 252. The extendable tube 262 is extended at a selected position to bear the distal end against a surface of the automobile, such as the seat or floor board in the back of the automobile. An alternate embodiment (not illustrated) uses only one of the extendable tubes, although two are preferred in order to provide forward and rear support for stabilizing heavier, larger cameras attached to the camera

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mount 200.

Fig. 7 illustrates a rear perspective, partially cutaway view of the camera support 250 and camera mount 200 attached to seats 281 with straps 270 which encircle the seats. The straps 270 have distal ends 272 that fold over and define loops 274 by sewing the end to the overlapped portion. The loop 274 ends of the straps 270 extend through the slots 26, 28 in the camera mount 200. A C-ring 276 is received on each of the loops 274, which C-ring bears against a side face of the camera mount 200, for securing the straps 270 to the camera mount. A matable portion of a buckle 278 and a clip 279 attach to the respective other ends of the straps 270. The buckle 278 and clip 279 are conventional, and a portion 280 of the strap 270 extends from the buckle for being pulled to cinch the straps 270 tightly around the seats 281. The telescoping tubes 262 extend and bear against surfaces, such as the floorboard 282, to stabilize the camera connected to the camera support 250. In an alternate embodiment, the strap is a single continuous ribbon of fabric material with a buckle at one end. The distal end of the strap extends through the camera mount 200, across the seats, and back through the camera mount. The distal end is threaded into the buckle and cinched tightly.

Fig. 8 is a perspective view of an alternate embodiment of a pivot block 300 for supporting a camera at an angle on the camera mount 200. The pivot block 300 comprises a base plate 302 with a pair of opposing sides 303 that extend upwardly. The base plate 302 defines a pair of holes 304 for receiving fasteners 306 that extend through the slots 22 for attaching the pivot block 300 to the camera mount 200. Clinch nuts 308 attach to the base plate 302 coaxial with the holes 304 for engaging the fasteners 306. The sides 303 each define a lower hole 310 for receiving a pin 312 and an upper hole 314. Clinch nuts 316 attach to interior faces of the sides 303 in alignment with the holes 314.

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The pivot block 300 also includes an upper pivot plate 318 having a pair of opposing sides 319. The plate 318 defines an opening 320 for receiving a threaded fastener 322 held therein conventionally by a C-ring received in a groove in the fastener. The fastener 322 connects the camera to the pivot block 300. A resilient pad (not illustrated) received on the pivot plate 316 dampens vibrations. The sides 319 each define a hole 324 and an arcuate slot 326. A threaded pin 328 extends through the slot 326 and the hole 314 to engage the clinch nut 316. The pins 312 extend through the holes 310 and 324 and provide for selective arcuate movement of the upper pivot plate as guided by the pin 328 travelling in the slots 326.

In operation, the pivot plate 318 connects to the base plate 302 by overlapping the sides 303, 319 and inserting the pins 312 in the aligned holes 310, 324. The pins 312 permit the pivot plate 318 to pivot relative to the base plate 302. The threaded pins 328 extend through the holes 314 and the slots 326 and engage the clinch nuts 316. The pivotable block 300 is then attached to the camera mount 200. The fasteners 306 extend through the aligned slots 22 in the camera mount and engage the clinch nuts 308. A camera (not illustrated) is connected with the fastener 322 to the pivot plate 318. The bolts 328 can be loosened for orienting the pivot plate 318 at a selected angle, whereby the camera can be disposed in a selected plane for recording images. The pins 328 travel in the slots 326 for selective positioning of the pivot plate 318 and are re-tightened to secure the pivot plate at the selected angle.

Fig. 9 is a perspective view of an alternate embodiment of a pivotable block 350 for supporting a lighter-weight camera on the camera mount 200. The block 350 comprises a base plate 352 having a pair of upwardly extending spaced-apart parallel flanges 354 at a first side. The base plate 352 defines a pair of holes 356 and clinch nuts 358 are coaxially aligned with each. The holes receive fasteners (not illustrated) for securing the block

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350 to the camera mount of the present invention. The flanges 354 have a trapezoid shape in end view, with the wider base of the trapezoid integral with the base plate 352. The flanges 354 define coaxially aligned threaded bores 360. A pivot plate 362 includes a depending trapezoid-shaped flange 364 that defines a bore 366. The flange 364 is disposed laterally inward of an edge 365 of the pivot plate 362, whereby the flange can be disposed between the pair of flanges 354. The pivot plate 362 defines a hole 368 for receiving a threaded fastener 370 for engaging a camera to the pivot plate. A bolt 372 having a grippable handle 374 engages the bores 360 in the base plate 352. The pivot plate 362 and the base plate 352 are readily manufactured, such as by extrusion or extruded or molding with minimal machining required.

In operation, the pivot plate 362 engages to the base plate 352 by inserting the flange 364 between the flanges 354 and aligning the bore 366 in the flange 364 with the bores 360 in the flanges 354. The bolt 372 threadingly engages the bores for securing the base plate and the pivot plate together. Although not illustrated, the pivotable block 350 is then attached to one of the camera mounts installed in an automobile. Fasteners engage the clinch nuts 358 to secure the block 350 to the camera mount. A camera is connected with the fastener 370 to the pivot plate 362. The bolt 372 can be loosened for orienting the pivot plate 362 at a selected angle, whereby the camera (not illustrated) can be disposed in a selected plane (preferably horizontal) for recording images.

The principles, preferred embodiments, and modes of operation of the present invention have been described in the foregoing specification. The invention is not to be construed as limited to the particular forms disclosed because these are regarded as illustrative rather than restrictive. Moreover, variations and changes may be made by those skilled in the art without departure from the spirit of the invention as described by the claims.

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CLAIMS

WHAT IS CLAIMED IS:

1. A camera mount for use in an motor vehicle to support a camera for recording images from the motor vehicle, comprising:

an elongated rigid member for being attached to a seatback of a motor vehicle and having a camera support surface;

a pivot plate pivotally connected to the camera support surface;

means for securing a camera to the pivot plate;

means for locking the pivot plate at a selected angle relative the camera support surface, whereby the camera can be selectively tilted for adjusting the angle of the camera view for recording images; and

means for connecting opposing ends of the rigid member to respective seatbacks of the motor vehicle in which the camera mount is installed.

2. The camera mount as recited in Claim 1, wherein the rigid member is an angle member.

3. The camera mount as recited in Claim 1, wherein the means for connecting comprises:

the rigid member having a bracket mounting surface at an angle relative to the camera support surface; and

bracket means operatively engaged to the bracket mounting surface for connecting each of said opposite ends of said rigid member to a headrest support in each of the seatbacks.

4. The camera mount as recited in Claim 3, wherein the bracket means comprises the bracket mounting surface defining an opening therein; and

a bracket that engages a respective one of the headrest supports;

a threaded member extending through the opening and

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engaged to the bracket; and
a fastener received on the threaded member.

5 5. The camera mount as recited in Claim 3, wherein
the bracket means comprises a j-bolt having a portion
extending around a respective one of the headrest supports
and having a threaded end which extends through an opening
in the bracket mounting surface; and

10 a fastener received on the threaded member, whereby
the rigid member is connected to the headrest support.

6. The camera mount as recited in Claim 3, wherein
the bracket means comprises:

15 a block defining a notch for receiving a portion of a
respective one of the headrest supports; and

 a threaded connector extending through an opening in
the bracket mounting surface and engaging the block; and

20 a fastener attached to the connector,
whereby the bracket means secures the rigid member to
the respective headrest support.

7. The camera mount as recited in Claim 1, wherein
the pivot plate comprises:

25 a support adapted for being connected to the rigid
member; and

 a plate member pivotally connected to the support for
receiving the camera thereon.

30 8. The camera mount as recited in Claim 7, wherein
the support defines an opening for receiving a bolt for
connecting the support to the camera support surface.

35 9. The camera mount as recited in Claim 7, wherein
the camera support surface defines a slot substantially
parallel to the longitudinal axis of the rigid member; and

 further comprising a connector that extends through
the slot and engages the support for selectively

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positioning the plate member longitudinally along the rigid member.

5 10. The camera mount as recited in Claim 9, wherein the means for securing the camera to the pivot plate comprises a hole in the plate member for receiving a bolt for connecting a camera thereto.

10 11. The camera mount as recited in Claim 1, wherein the means for connecting comprises at least one strap attached at a first end thereof to the elongated member and being adapted at a second end thereof for detachable engagement to a buckle attached to the elongated member, for extending around the seatback and engaging the buckle
15 whereby the elongate member is secured to the seat of the motor vehicle.

20 12. The camera mount as recited in Claim 1, wherein the camera support surface defines an elongated first slot extending along a line substantially parallel to a longitudinal axis of the member; and

 further comprising:

25 a bracket mounting surface in the rigid member defining at least two second slots coaxially aligned therein and spaced apart, said second slots extending along a second line substantially parallel to the longitudinal axis of the member; and

30 brackets respectively received through the second slots for rigidly connecting the elongated member to headrest supports in the back of a seat of the automobile in which the camera mount is installed.

35 13. The camera mount as recited in claim 12, wherein the securing means comprises:

 the pivot plate defining a hole for receiving a threaded bolt;

 the threaded bolt defines an annular groove around a

-22-

perimeter surface of the threaded bolt; and

a c-ring secured to the groove after the threaded bolt is received in the hole in the pivot plate,

whereby the c-ring prevents the threaded bolt from being removed from the pivot plate.

14. The camera mount as recited in claim 12, further comprising means for adjusting the angle of pivot of the pivot plate.

15. The camera mount as recited in claim 12, wherein the pivot plate comprises:

a support block which is U-shaped in front plan view; and

a pivot member which is U-shaped in front plan view, and disposed in inverted position matingly receives the support block, which support block and pivot member are pivotally joined together for pivoting the pivot member relative to the support block, whereby the angle of the camera view is selectively adjustable.

16. The camera mount as recited in claim 15, wherein the pivot member defines at least one arcuate slot for receiving a fastener therethrough; and wherein the support block further includes a securing member for receiving the fastener, whereby the pivot member is pivoted as guided by the fastener in the arcuate slot to a selected angle and secured thereat by tightening the fastener in the securing member.

17. The camera mount as recited in claim 12, wherein the brackets each comprise a block defining a notch for receiving a portion of a headrest support and having a threaded connector extending from the block for being received through a respective one of the second slots; and a fastener for being received on the connector whereby the bracket is secured to the elongate rigid member while

engaging the headrest support.

18. The camera mount as recited in claim 17, wherein the block defines a land portion which is received within the respective second slot.

19. The camera mount as recited in claim 1, wherein connecting means comprises:

at least one buckle attached to the rigid member; and
at least one strap attached at a first end to the elongated member and being adapted for engagement to the buckle, for extending around a seat back and engaging the buckle whereby the elongate member is secured to the seat of the automobile in which the camera is to be installed.

20. A method of securing a camera in an automobile for recording images from the automobile, comprising the steps of:

(a) placing an elongated rigid member between a pair of headrest supports extending from seats of an automobile, the rigid member defining a camera support surface having an elongated first slot therein, said first slot extending along a line substantially parallel to a longitudinal axis of the member and a bracket mounting surface defining at least one pair of second slots coaxially aligned therein and spaced apart, said second slots extending along a second line substantially parallel to the longitudinal axis of the member;

(b) rigidly connecting the elongated member to the headrest supports in the seat of the automobile with brackets respectively extending through the second slots;

(c) attaching a support block to the camera support surface, the support block defining at least one threaded bore and rigidly connected to the camera support surface by at least one bolt extending through the first slot and into the threaded bore, whereby the support block is selectively positioned along the first slot;

(d) pivotally connecting a pivot plate to the support block, whereby said pivot plate is selectively tilted for adjusting the angle of the view of a camera connected thereto for recording images; and

5 (e) locking the pivot plate in a selected angle relative the support block,

whereby a camera, connected to the pivot plate, is selectively positioned in the automobile, for recording images.

10 21. A bracket for connecting a camera mount to a rectangular support for a headrest in an automobile seat, said camera mount for use in an automobile to support a camera for recording images during operation of the automobile, wherein the camera mount comprises an elongate member disposed on an upper surface of a seat back in an automobile for receiving and supporting a camera and having at least one slot in a side face for receiving a fastener therethrough to connect the camera support to a headrest support in the seat of the automobile, comprising:

15 a block having a side defined by a first face and a second face which are parallel to a plane on a longitudinal axis of the block, said first face disposed in a plane closer to the longitudinal axis than the plane in which said second face is disposed, whereby said side of the block defines a notch therein for receiving a portion of a rectangular headrest support; and

25 the block defining a tapped bore extending partially therein from the second face for receiving a fastener for connecting said camera mount to said bracket.

30 22. The bracket as recited in claim 21, wherein at least one land portion extends laterally from the second face for being received within a mating opening in the camera mount whereby the extending land restricts the bracket from rotational movement while the fastener is attached to the bracket.

23. A cushion pad for attachment to a face of a camera mount for use in an automobile to support a camera for recording images during operation of the automobile, wherein the camera mount comprises an elongate member disposed on an upper surface of a seat back in an automobile for receiving and supporting a camera and having at least one slot in a side face for receiving a fastener therethrough to connect the camera support to a headrest support in the seat of the automobile, comprising:

- an elongate backing board;
- a cushion member of a resilient material attached to the backing board;
- plurality of connectors extending laterally from the backing board on a side opposite the cushion member for engaging the backing board to a face of the camera mount.

24. A camera support for attachment to a camera mount for use in an automobile to support a camera for recording images of objects from the automobile, wherein the camera mount comprises an elongate member disposed on an upper surface of a seat back in an automobile for receiving and supporting a camera and having at least one opening in a side face for receiving a fastener therethrough to connect the camera support to a headrest support in the seat of the automobile, comprising:

- a support plate defining a planar surface for supporting a camera thereon;
- at least one lateral side extending from the plate;
- the support plate defining a central threaded bore for receiving a fastener therein for connecting the support plate to a camera mount;
- at least one pin connected to the lateral side in a first distal portion of the support plate;
- a telescopically extendable tube attached to the pin for pivotal movement about the pin, said tube being extendable to a selected length at a selected angle for a distal end to bear against a surface of the automobile; and

means for securing a camera to the support plate.

25. A camera mount for use in a motor vehicle to support a camera for recording images from the motor vehicle, comprising:

an elongated member for being positioned against a seatback of a seat of a motor vehicle and having a camera support surface;

pivotable support means connected to the camera support surface for supporting a camera at a selected angle relative to the elongated member;

a pair of straps connected at respective first distal ends to opposing ends of the elongated member and respective second distal ends engaged to a buckle means for connecting the pair of straps together,

whereby the straps extend around the seatback for securing the elongated member against the seatback.

26. The camera mount as recited in claim 25, wherein the respective first distal ends of the strap define loops; the elongate member defines openings in opposing end portions thereof through which the respective first distal ends extend; and

clips which engage the loops and prevent the strips from being removed from the openings,

whereby the straps are secured to the elongated member.

27. A pivot block for supporting a camera at a selected angle on a support, comprising:

a base plate with a pair of opposing sides extending therefrom;

connector means for attaching the base plate to a support;

each side defining a first opening near the base plate and a second opening distal from the base plate;

a clinch nut secured coaxially with the second

opening;

5 a pivot plate with a pair of opposing sides which define a pivot opening, an arcuate slot concave towards the base plate, and camera connecting means for attaching a camera to the pivot plate;

a pair of pins, each received through a respective one of the pivot openings of the pivot plate and the respective aligned first opening in the base plate, whereby the pivot plate pivots relative to the base plate about the pins; and

10 at least one threaded pin extending through one of the arcuate slots of the pivot plate and the aligned second opening of the base plate and engaging the clinch nut, whereby the pivot movement of the pivot plate is guided by the threaded pin traveling relative to the arcuate slot and
15 the pivot plate is secured in a selected position by tightening the threaded pin to the pivot plate.

28. A pivot block for supporting a camera at a selected angle on a support, comprising:

20 a base plate with a pair of spaced-apart flanges extending from a first side portion of the base plate, and at least one of the flanges defining a bore;

connector means for attaching the base plate to a support;

25 a pivot plate with a pivot flange extending therefrom and received between the spaced-apart flanges of the base plate, the pivot flange defining a threaded bore coaxial with the bore in the flange of the base plate, and camera engaging means for attaching a camera to the pivot plate;
30 and

a threaded fastener extending through the bore in the flange of the base plate and engaging the threaded bore in the pivot plate, whereby the pivot plate is moveable to selected angel relative to the base plate and secured
35 thereat by tightening the threaded fastener to the pivot plate,

whereby a camera, being attached to the pivot plate, is positionable at a selected angle for recording images.

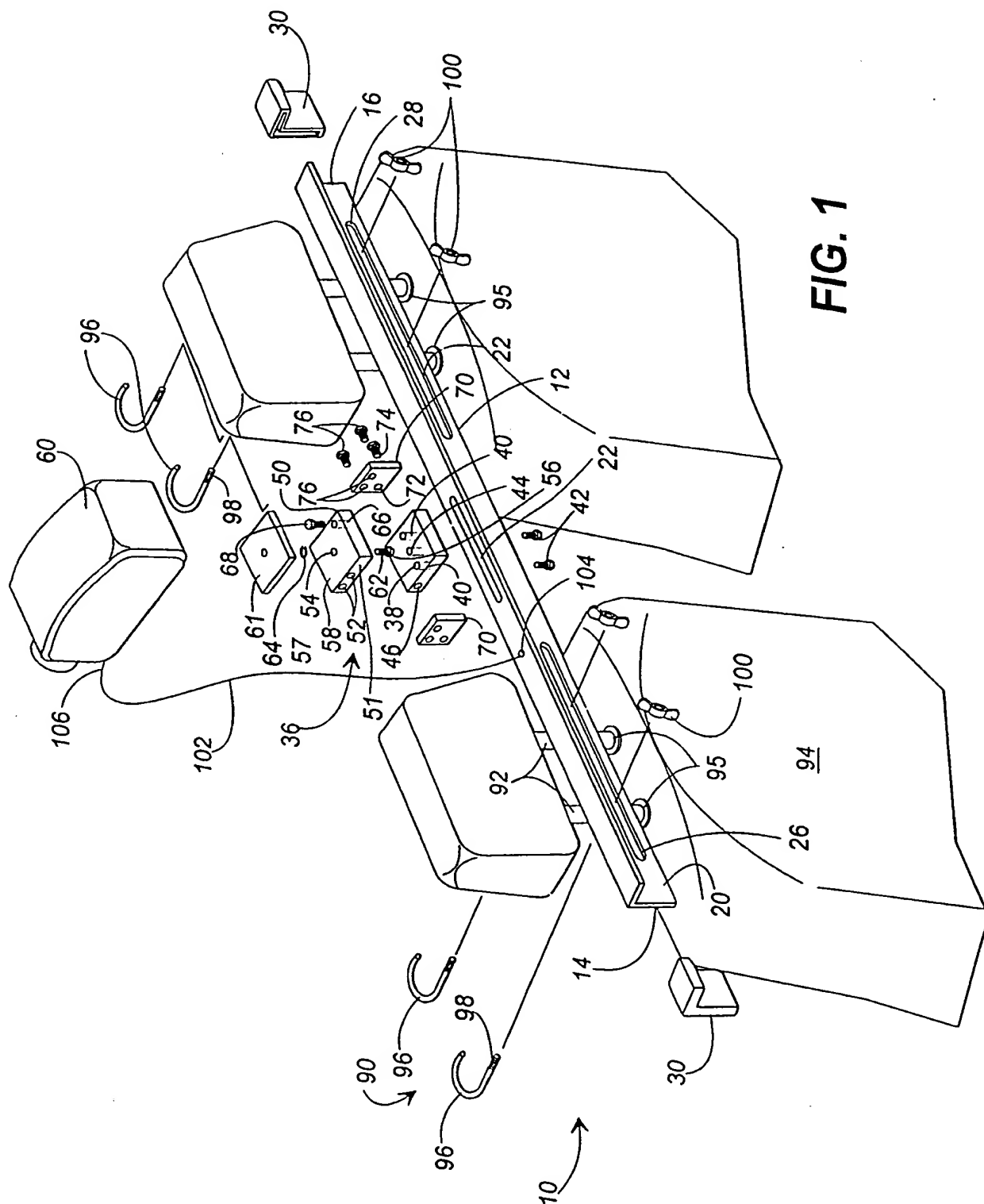
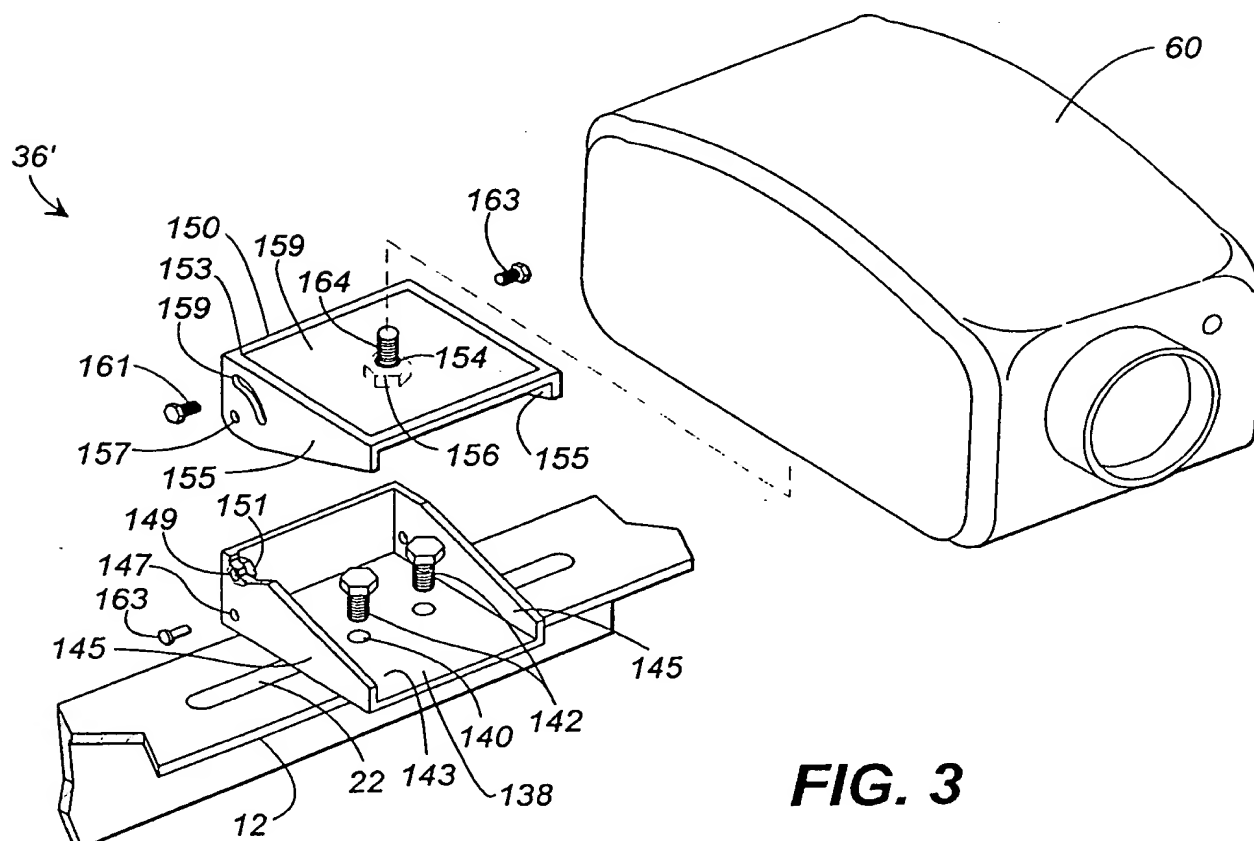
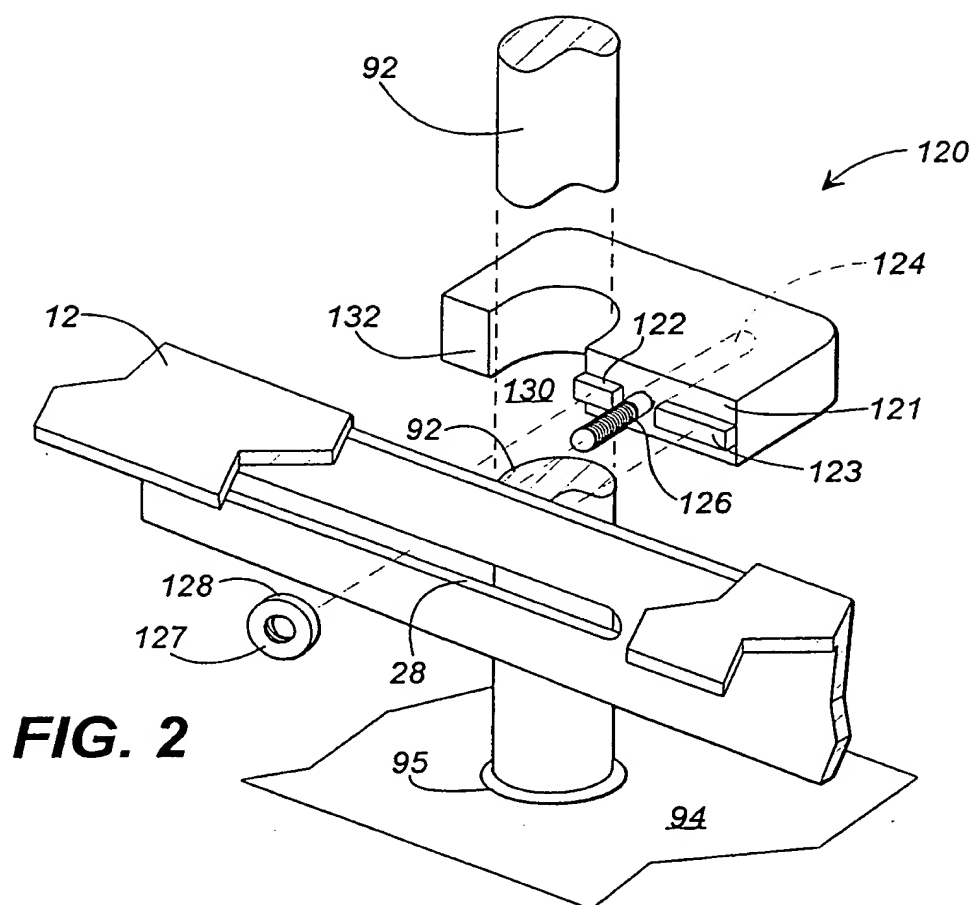
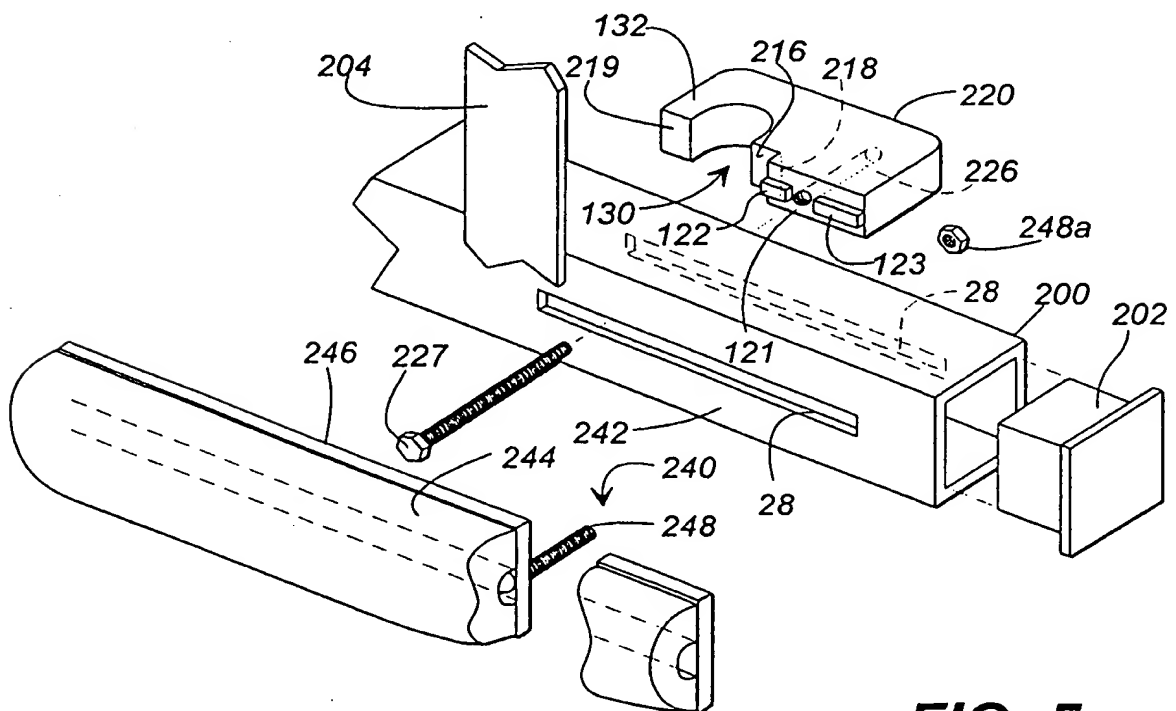
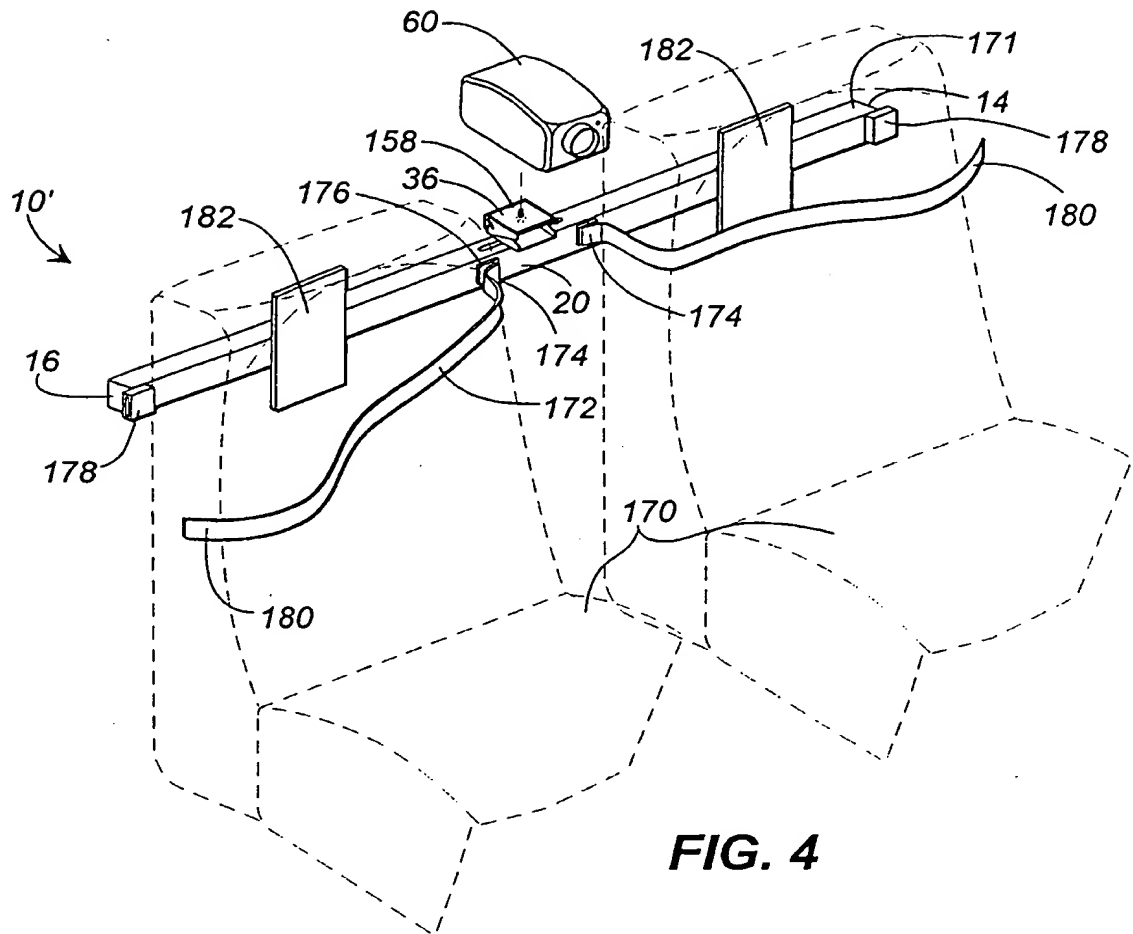


FIG. 1





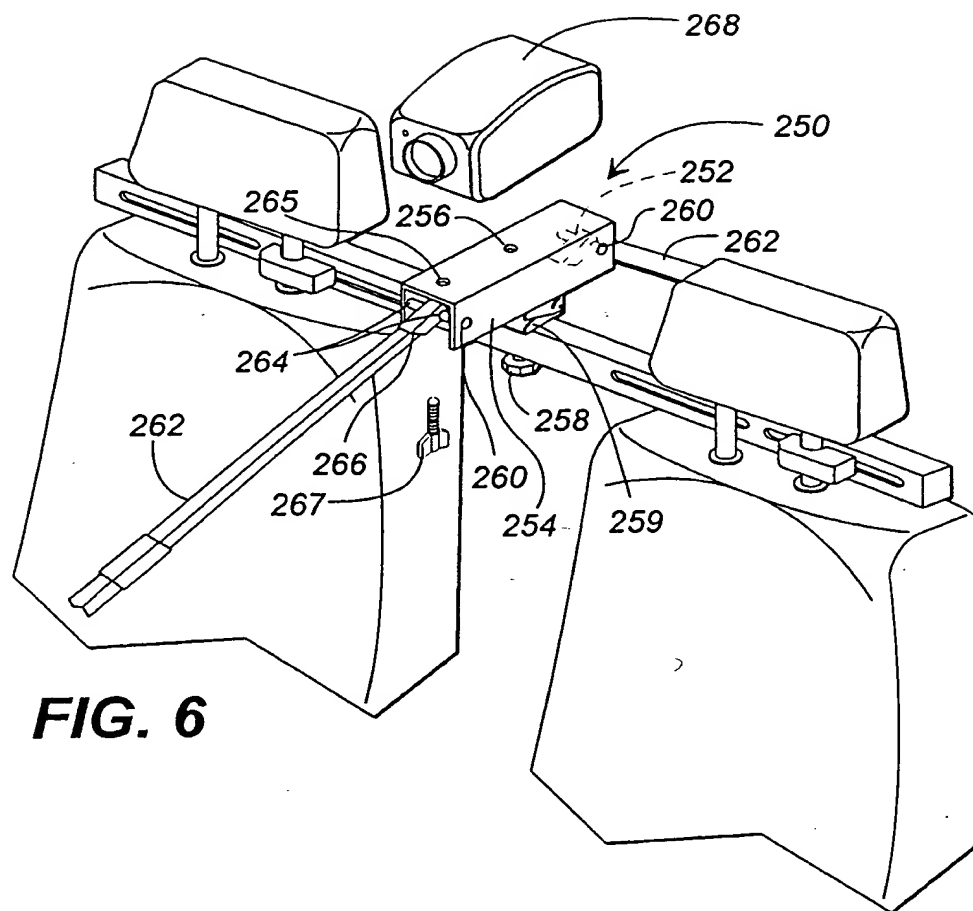
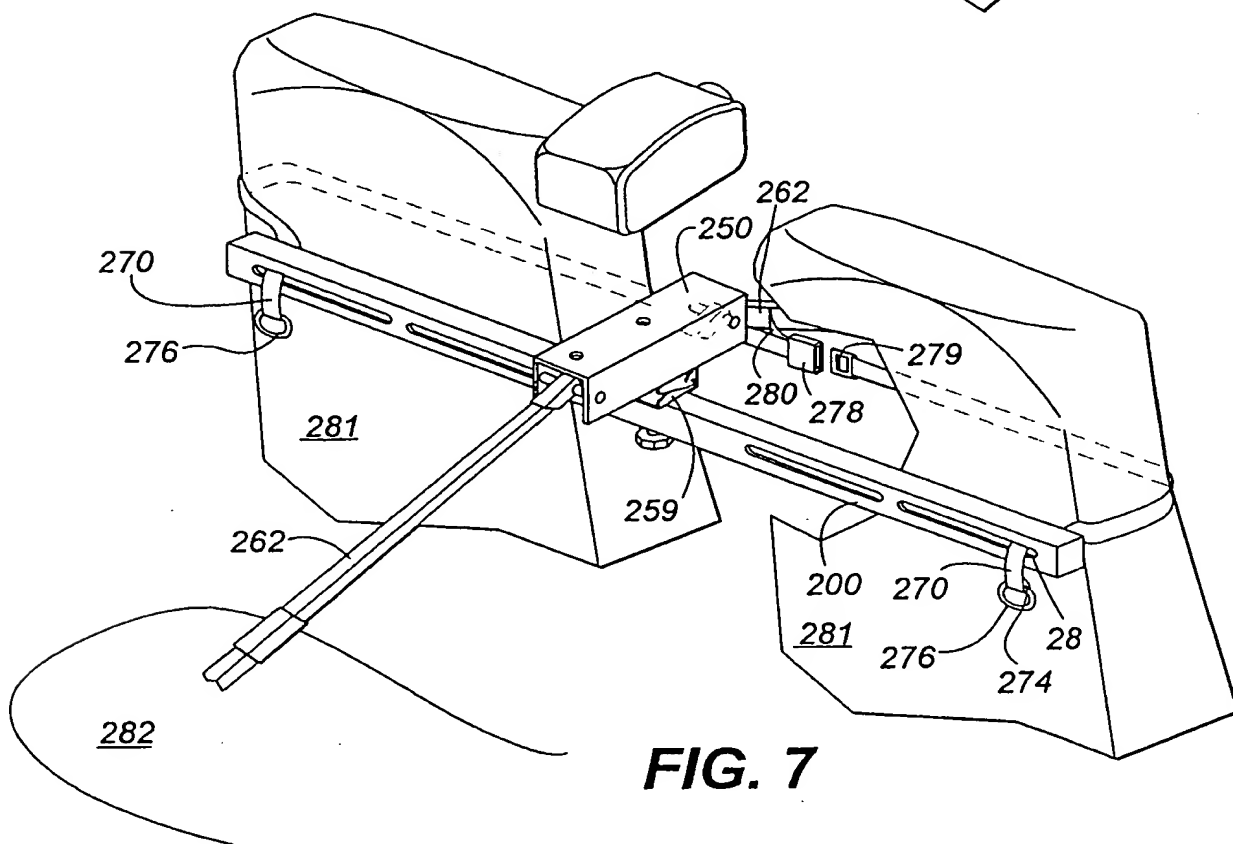
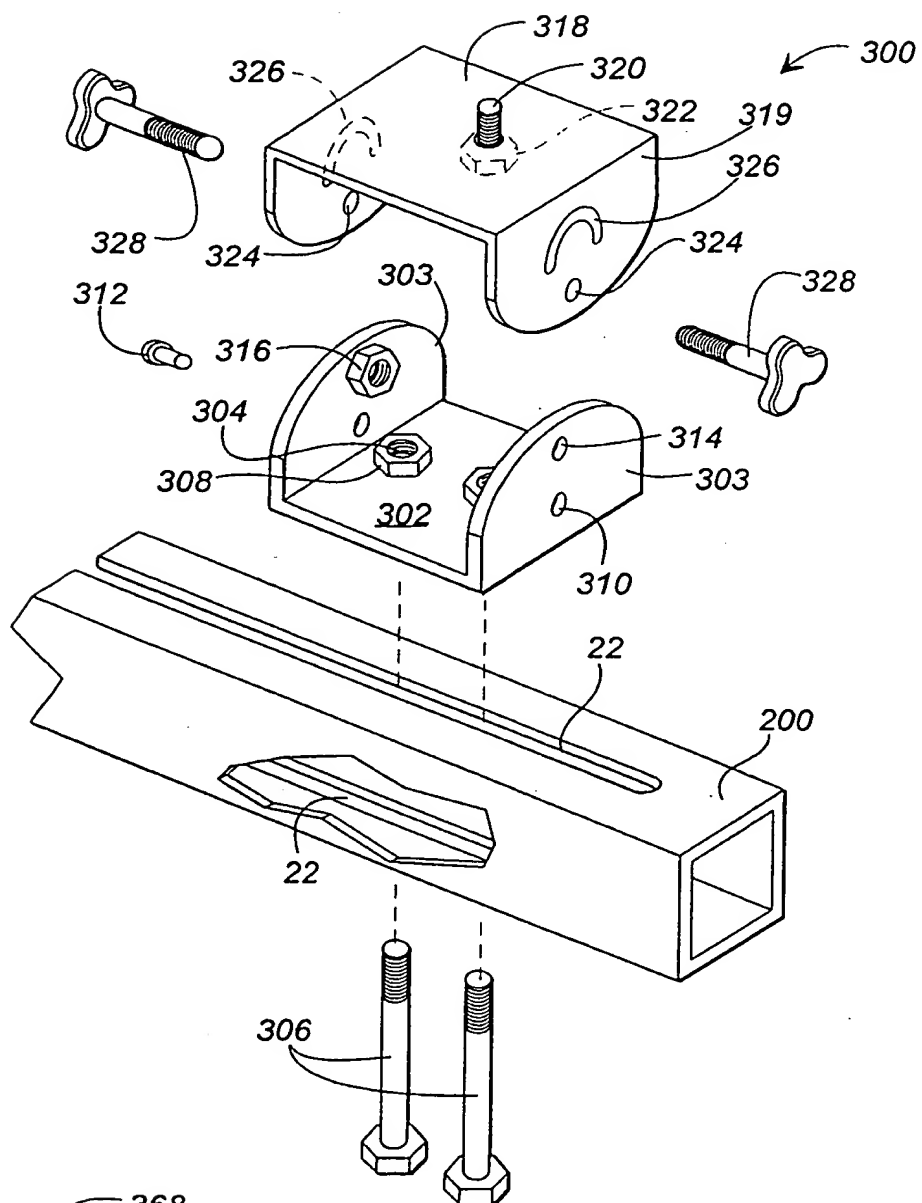
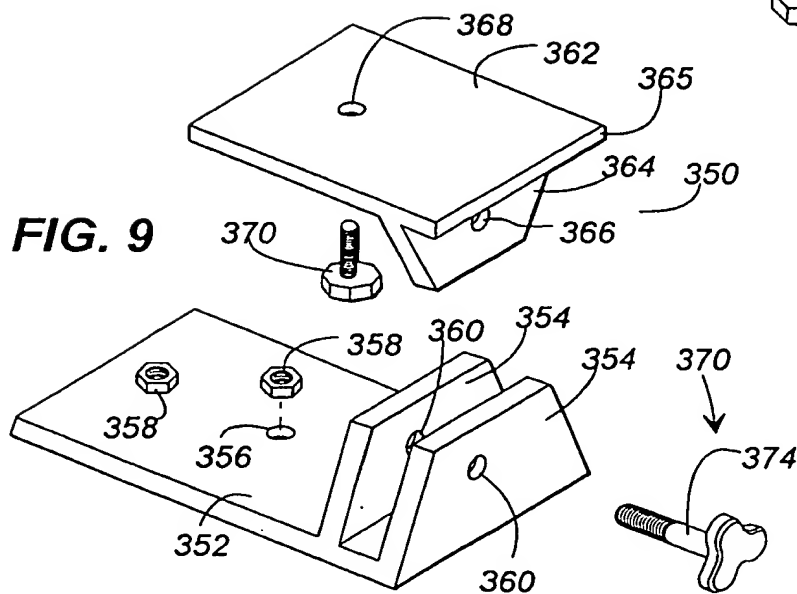
**FIG. 6****FIG. 7**

FIG. 8**FIG. 9**

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/17937

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :B60R 7/04; F16M 11/10

US CL :224/275, 558, 572, 908; 248/185.1; 396/419, 428

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Foreign art collection 913 in Class 396

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2,574,007 A (ANDERSON) 06 November 1951, see figure 4	21, 22
X	US 4328915 A (MELTON, III) 11 May 1982, see figure 3	21, 22
X	AT 167,405 A (PODOLSKY) 10 January 1951, see figures 1 and 2	25, 26
X	US 3,128,982 A (CHRISTOPHER) 14 April 1964, see elements 26, 30, 34	28
Y	US 2,481,717 A (BLAIR) 13 September 1949, See figure 1	27
Y	US 277,650 A (WRIGHT) 15 May 1883, See elements n	27

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

19 JANUARY 1999

Date of mailing of the international search report

02 FEB 1999

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/17937

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 359011939 A (KAZAMAKI) 21 January 1984, see figure 1	NONE
A	GB 2238993 A (MCKIE) 19 June 1991, See figures 1 and 2	NONE
A	US 3752376 A (SHELTON ET AL.) 14 August 1973, See figure 1	NONE
A	US 4,029,246 A (WOODRUFF) 14 June 1977, See figures 1 and 2	NONE
A	US 765,980 A (MERCIER) 26 July 1904, See figure 1	NONE
Y	US 3,970,274 A (RESK) 20 July 1976, See elements 61 and 68	27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/17937**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
1-22 and 24-28
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/17937

B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

224/275, 448, 539, 545, 547, 548, 550, 551, 553, 554, 555, 558, 560, 564, 572, 908, 927; 248/185.1, 286.1, 230.5, 231.61; 396/419, 428

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

It is noted that the claims have been misnumbered. The claims are numbered 1-18 and then 16-25 which will hereinafter be interpreted as 1-28, respectively.

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group A, claims 1-20, drawn to a camera mount having a bracket with opposing ends connected to respective seatbacks in a vehicle and means for locking a pivot plate at a selected angle secured to the bracket.

Group B, claims 21 and 22, drawn to a bracket for connecting a camera mount to a headrest comprising a block.

Group C, claim 23, drawn to a cushion pad for attachment to a camera mount disposed on an upper surface of a seatback.

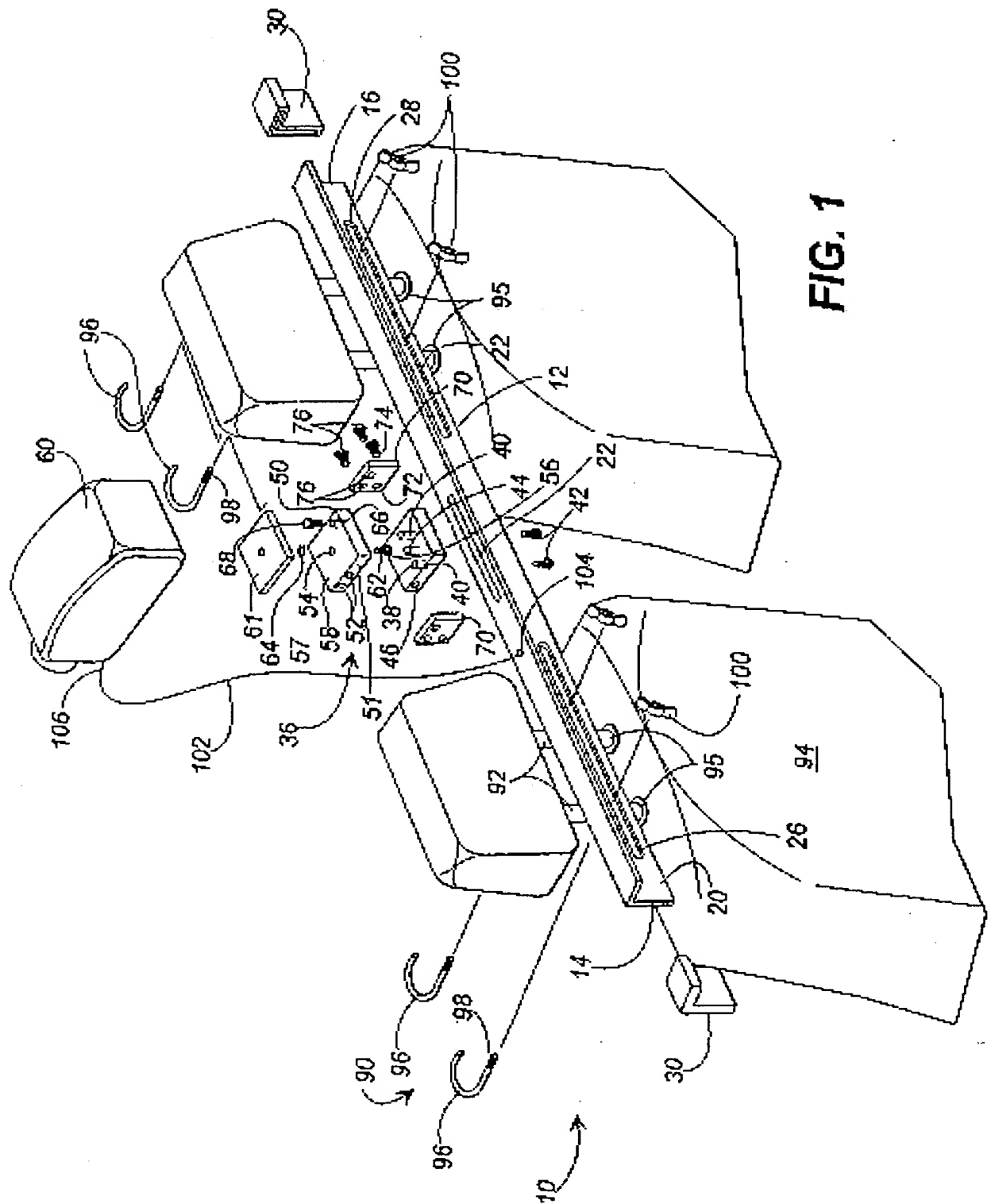
Group D, claim 24, drawn to a camera support for attachment to a camera mount disposed on an upper surface of a seatback.

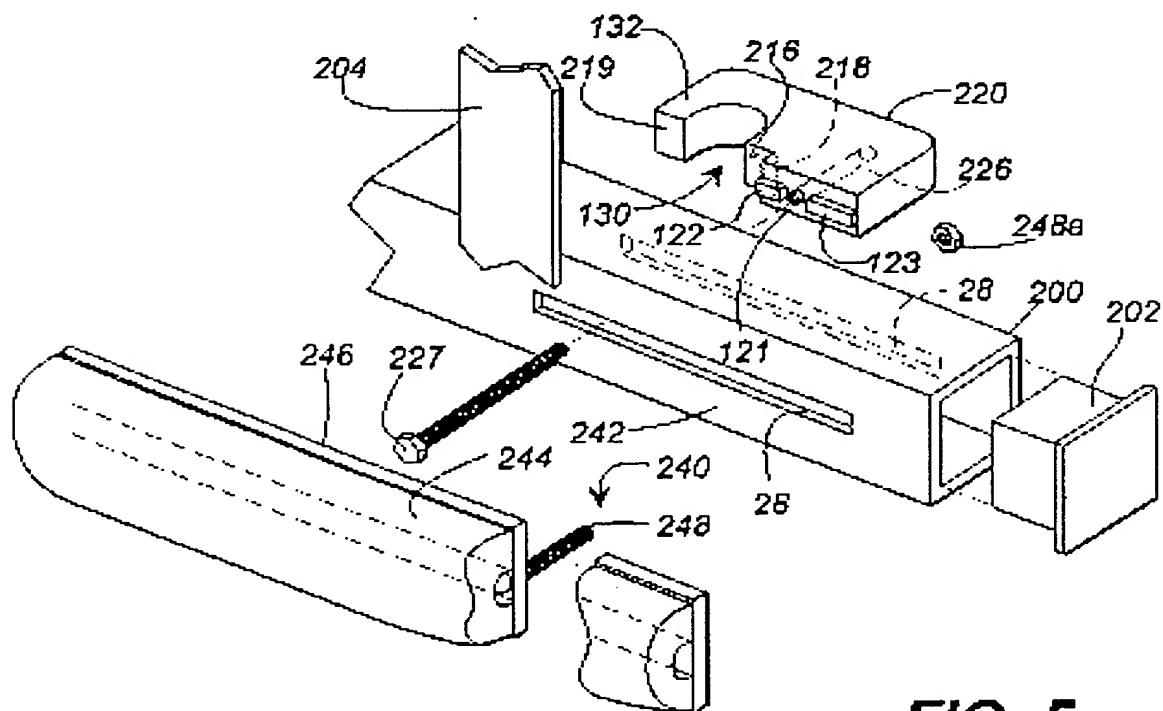
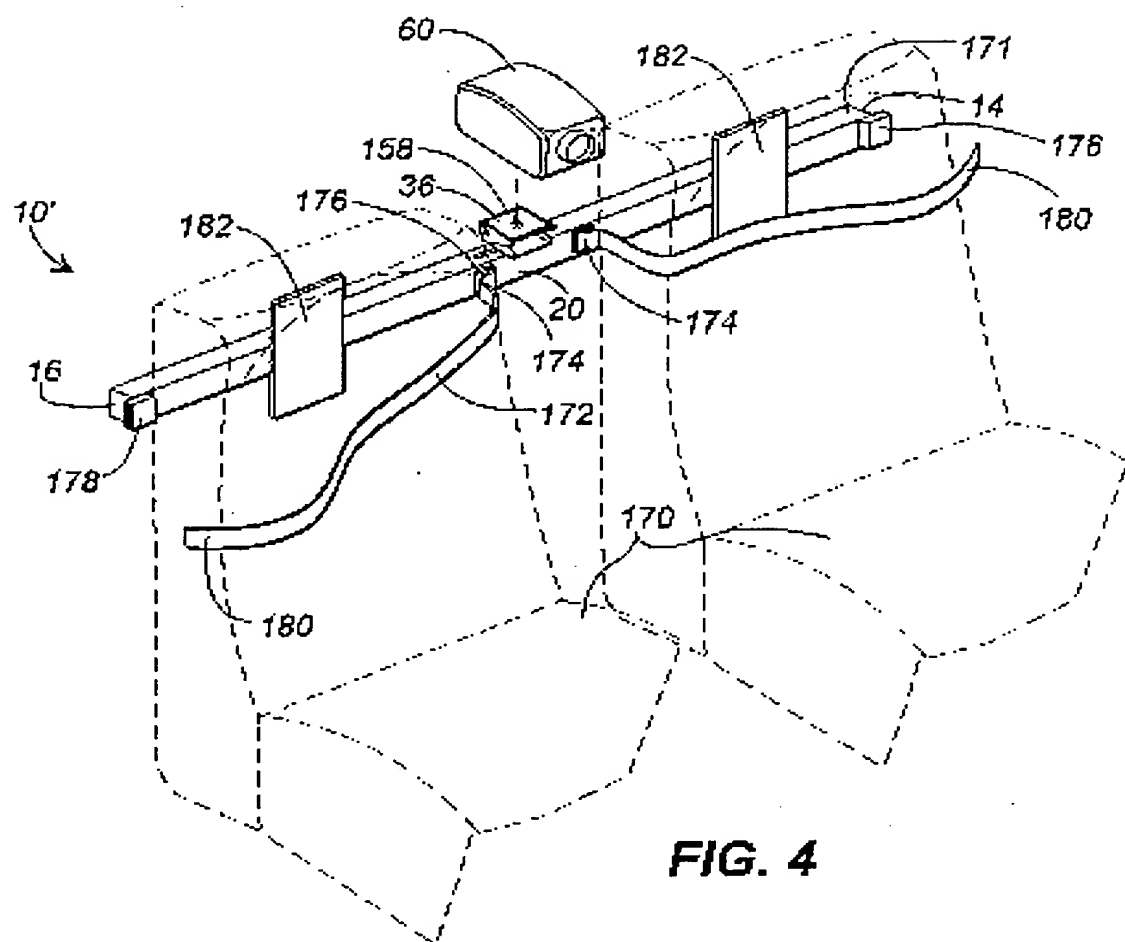
Group E, claim 25, drawn to a camera mount for use in a vehicle comprising an elongated member secured against a seatback by a pair of straps.

Group F, claim 27, drawn to a pivot block for securing a camera comprising a pivot plate having an arcuate slot.

Group G, claim 28, drawn to a pivot block for securing a camera comprising a pivot plate having a flange received between spaced apart flanges extending from a first portion on a base.

The inventions listed as Groups A-G do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: a camera mount comprising a rigid member secured, a pivot plate secured to the member, means for securing a camera to the pivot plate, and means for connecting the opposing ends of the rigid member to respective seat backs of a motor vehicle in which the camera mount is installed.





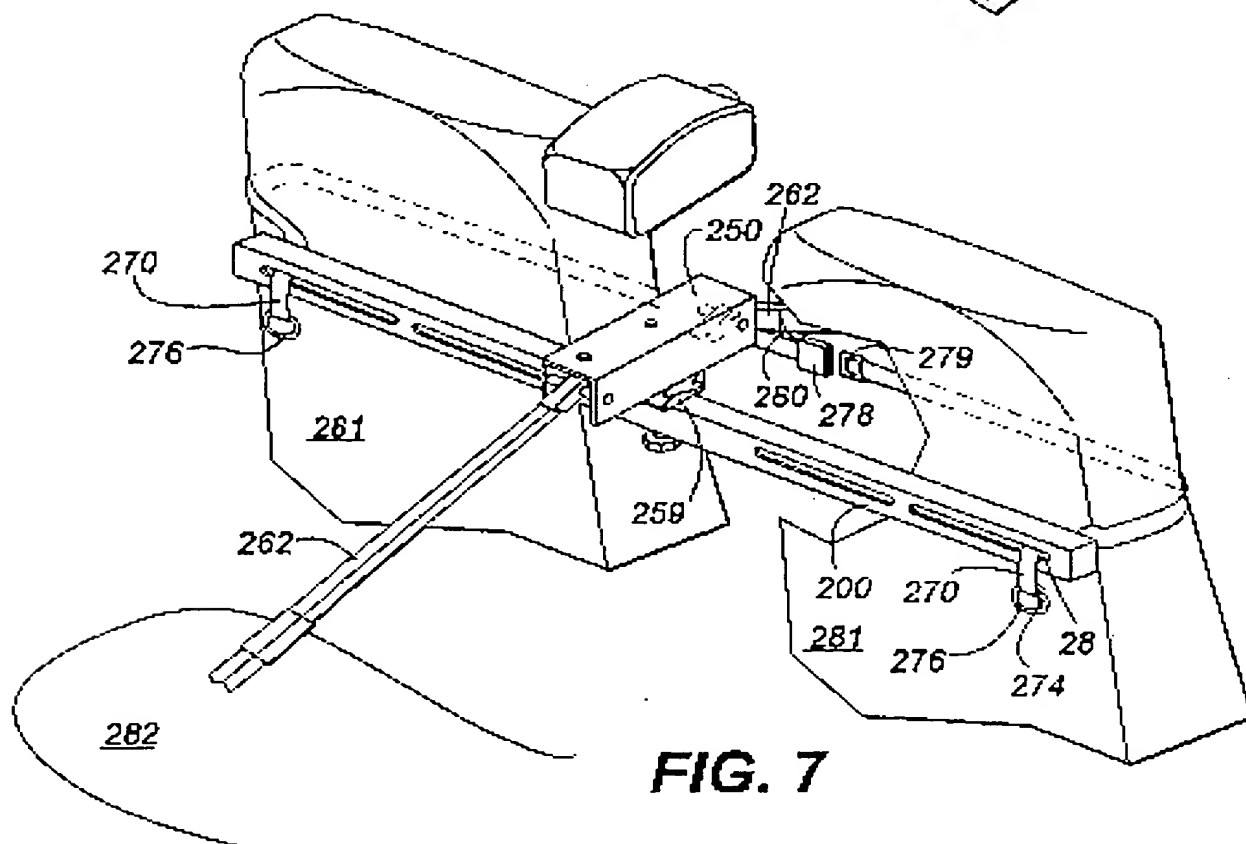
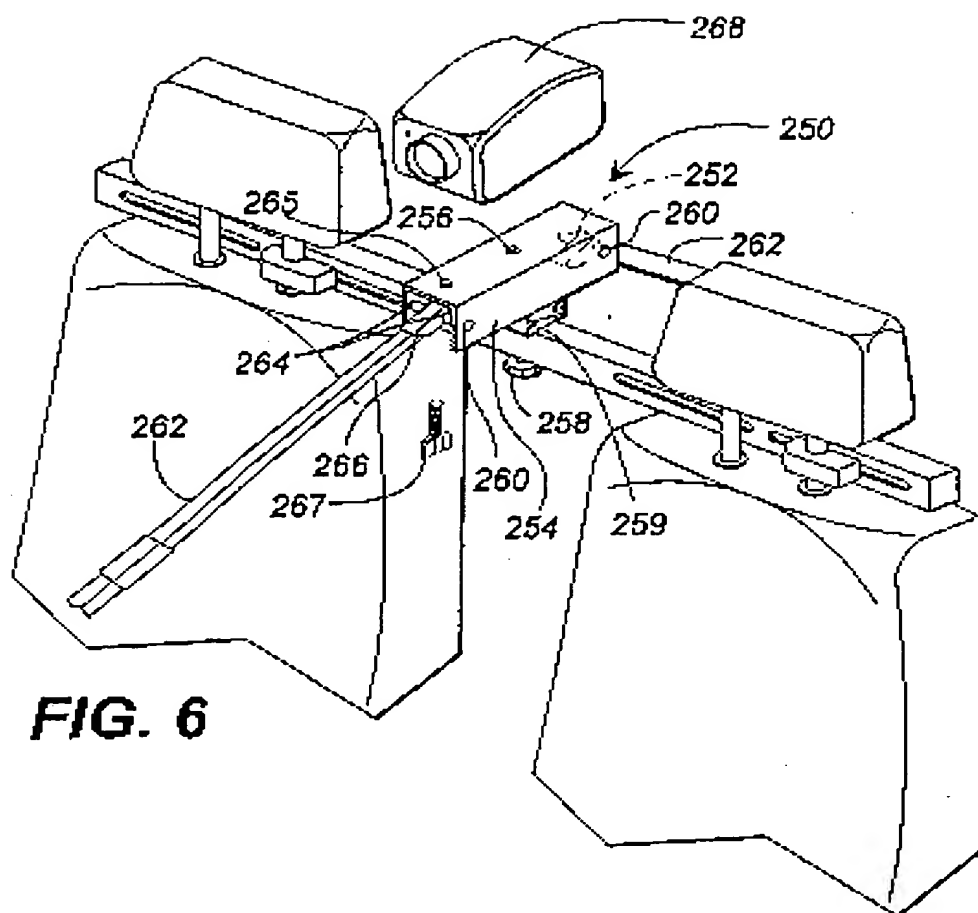
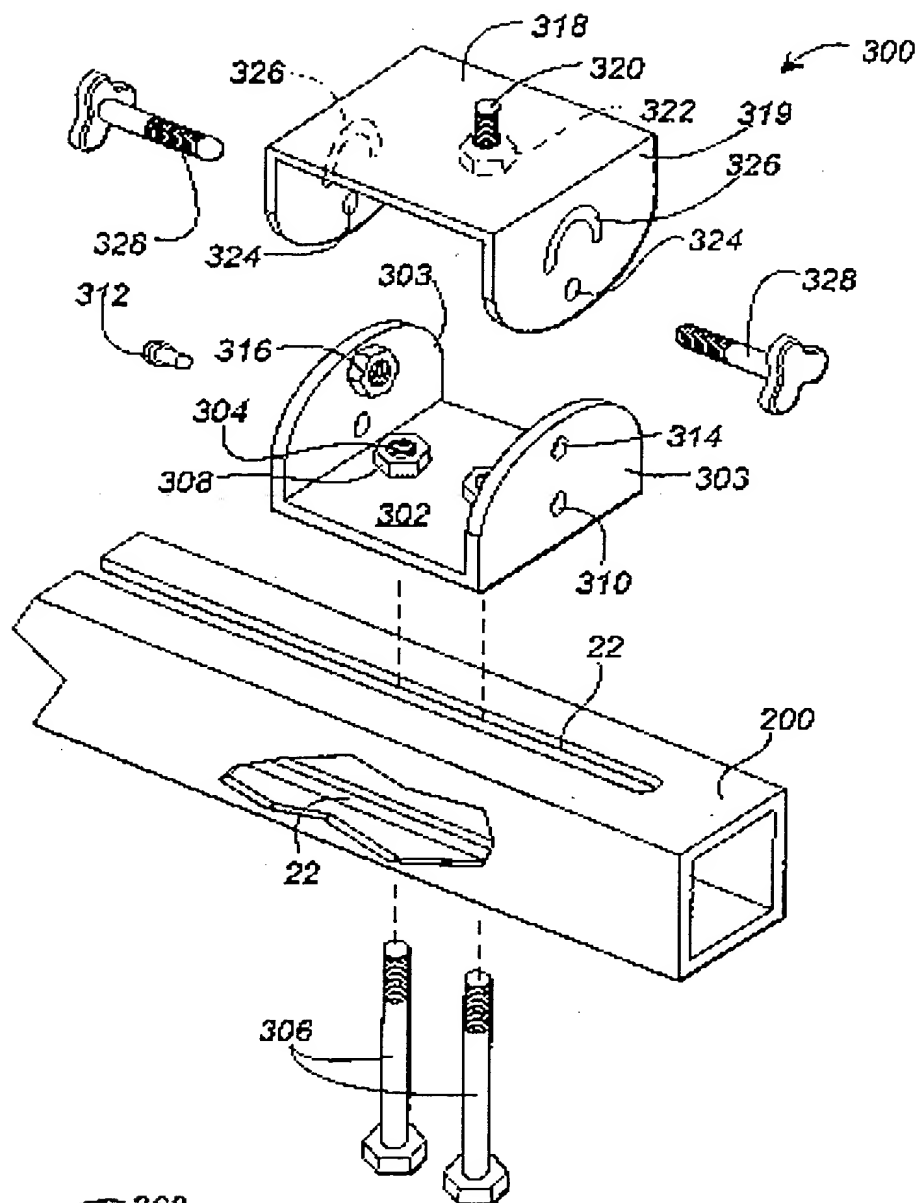
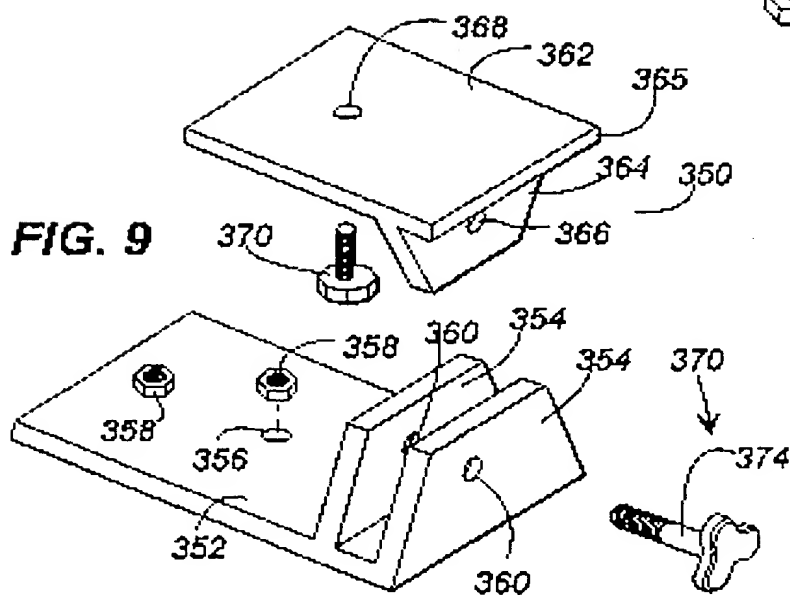


FIG. 8**FIG. 9**

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